Dust Particles' Long Journey Puzzles Experts

By WILLIAM K. STEVENS

"GIANT" dust particles, blown thousands of miles across the Pacific Ocean in apparent defiance of known atmospheric processes, are confounding meteorologists and oceanographers.

It is not unusual for huge clouds of dust, stirred up by storms on land, to be carried thousands of miles downwind. Scientists believe that the minerals borne by such "pulses" of dust from the continents fall into the ocean and help enrich and nurture life.

So when such a pulse of dust from China reached Midway Island and Hawaii in March 1986, scientists on hand to study the phenomenon were not surprised to find that it had come that far: more than 6,000 miles in nine days. But they were astounded, upon analysis by electron microscope, to find that the pulse consisted of grains of quartz so large that it seemed physically impossible for them to travel such a distance.

"It is a mystery at this point," said Peter R. Betzer, an oceanographer at the University of South Florida, who led the study. Could some previously unknown atmospheric process be at work? No one knows the answer, and the mystery has caused considerable head-scratching and consternation.

'I Was Skeptical Too'

"Most meteorologists are very skeptical of our results," said another member of the study group, John T. Merrill, a meteorologist at the University of Rhode Island. "I must admit that it's very difficult to understand. I was skeptical too to begin with."

The findings were published in the current issue of Nature, the authoritative British science journal.

Samples of the dust were recovered from both the air and water by investigators at Midway and Oahu, and aboard a ship 400 miles north of Hilo, Hawaii. Dr. Betzer said that while the quartz granules would be "just a minor irritation on your contact lens," they were giant compared with what is normally found in such dust pulses.

More than 80 percent of the granules measured more than 70 micrometers in diameter. That is "just unheard-of," Dr. Betzer said. "Normally the cutoff is at about 16 micrometers. We didn't expect it. We weren't prepared for this."

If the largest of these particles were spherical, Dr. Merrill said, they would fall the entire five miles through the lower atmosphere to the earth's surface in one day rather than being carried along in the upper atmosphere for nine. They are not spherical, but of varied shapes that would fall more slowly.

Still, he said, "they are not able to fly like an airplane," and clearly should not be able to travel as long or as far as they did.

"Therefore," he said, "we must assume there is some re-suspension mechanism pushing them back up through the atmosphere."

Clouds might provide such a mechanism, he said. But the air patterns associated with rain-bearing clouds mean that "for every particle that is uplifted by a storm, there should be many particles that are pushed down." The particles that remained would probably be only [illegible] small fraction of all those that l[illegible] Asian mainland, he said, requ[illegible]hat "all of China be dusty all th[illegible]me; no one would would be able to see five miles anywhere."

Another possible mechanism would be a vertical helix, or spiral, of circulating air much like that found in the oceans, said Kendall Carder, a physical oceanographer at the University of South Florida and another member of the study team. Such an atmospheric helix could "c[illegible]bly trap" the particles, Dr. C[illegible]

But no one will [illegible] acterize any of the[illegible] pothesis.